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IMPORTANCE OF PLANTS IN THE *CH'A CHAAK* MAYA RITUAL IN THE PENINSULA OF YUCATAN

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ABSTRACT.—This study was carried out in the Mayan farming area in the state of Yucatan, Mexico. Twelve Mayan rain rituals, ***ch'a chaak***, literally "rain calling," were attended. Thirty-eight plant species were used during these rituals, which lasted four to seven days each. A high percentage (63%) of these plants are symbolically related to rain. Many are succulents. Eleven of the twelve rituals that we attended were followed by rain. Of the 38 plants used in the ***ch'a chaak***, 33 are native, only five having been introduced since the arrival of the European conquerors. We calculated an elaborated index of cultural "purity" for these rituals of 87%. These rain rituals draw on the total cultural knowledge the Mayans have of their environment, thus preserving this valuable knowledge is important.

RESUMEN.—El estudio de la ceremonia maya del ***ch'a chaak*** (que significa el llamado de la lluvia) se realizó en el área maya milpera en el estado de Yucatán. Se asistió a doce rituales y se encontró que durante el proceso del rito, el cual dura cuatro días y a veces hasta una semana, se usan 38 especies vegetales en diversas formas. Un alto porcentaje (63%) de estas plantas están relacionadas con la lluvia, según la creencia de los milperos; algunas de ellas son suculentas indicadoras de humedad, lo cual le da efectividad a sus rezos. De las doce ocasiones que asistimos al rito de invocación a la lluvia, once de ellas fueron efectivas. El rito en sí conserva una gran pureza, ya que de las 38 plantas usadas, 33 son nativas del área milpera y sólo cinco han sido introducidas a partir de la llegada de los europeos. El porcentaje de pureza se calculó en base a un índice de relación; el resultado fue de 87% de pureza, lo cual refleja el hecho que casi todas las plantas empleadas en el ***ch'a chaak*** son nativas del área. El rito encierra el conocimiento total que la cultura maya tiene de su medio ambiente; conservarlo es importante, ya que es un conocimiento cultural valioso.

RÉSUMÉ.—Cette étude a été réalisée dans une région agricole maya de l'État de Yucatan au Mexique où nous avons assisté à douze rituels de pluie (***ch'a chaak***, littéralement « appel à la pluie »). Trente-huit espèces végétales ont été utilisées durant ces cérémonies qui duraient de quatre à sept jours chacune. Un pourcentage élevé (63%) de ces plantes est lié symboliquement à la pluie et plusieurs plantes ont, de façon caractéristique, des tissus gonflées de substances liquides. Onze des douze rituels auxquels nous avons participé ont été suivis de pluie. Trente-trois des trente-huit plantes utilisées sont indigènes et cinq seulement ont été introduites après l'arrivée des conquérants européens. Le degré de « pureté » culturelle de ce rituel a été évalué à 87 % selon une méthode de calcul élaborée. Ce rituel met à contribution la connaissance culturelle totale maya de l'environnement et la sauvegarde de ce savoir de grande valeur en est d'autant plus importante.

INTRODUCTION

The current research was carried out between 1992 and 1993 in the maize region of Yucatán state, México, situated in the traditional Yucatec Maya area (Figure 1). Maya maize farmers call the season of the year in which rain is scarce the *canícula*. The Maya still practice the ***ch'a chaak*** ceremony, an ancient ritual in which they invoke the rain god ***chaak*** for rain so that they do not lose the current crops in their *milpas* (maize fields) (Flores and Ucan Ek 1983; Flores 1987). Prior to this study, permission was given by 12 Maya priests who perform this ritual (***h'men***) to observe their activities as part of the Yucatan Ethnoflora Program of the Universidad Autónoma de Yucatán (UADY).

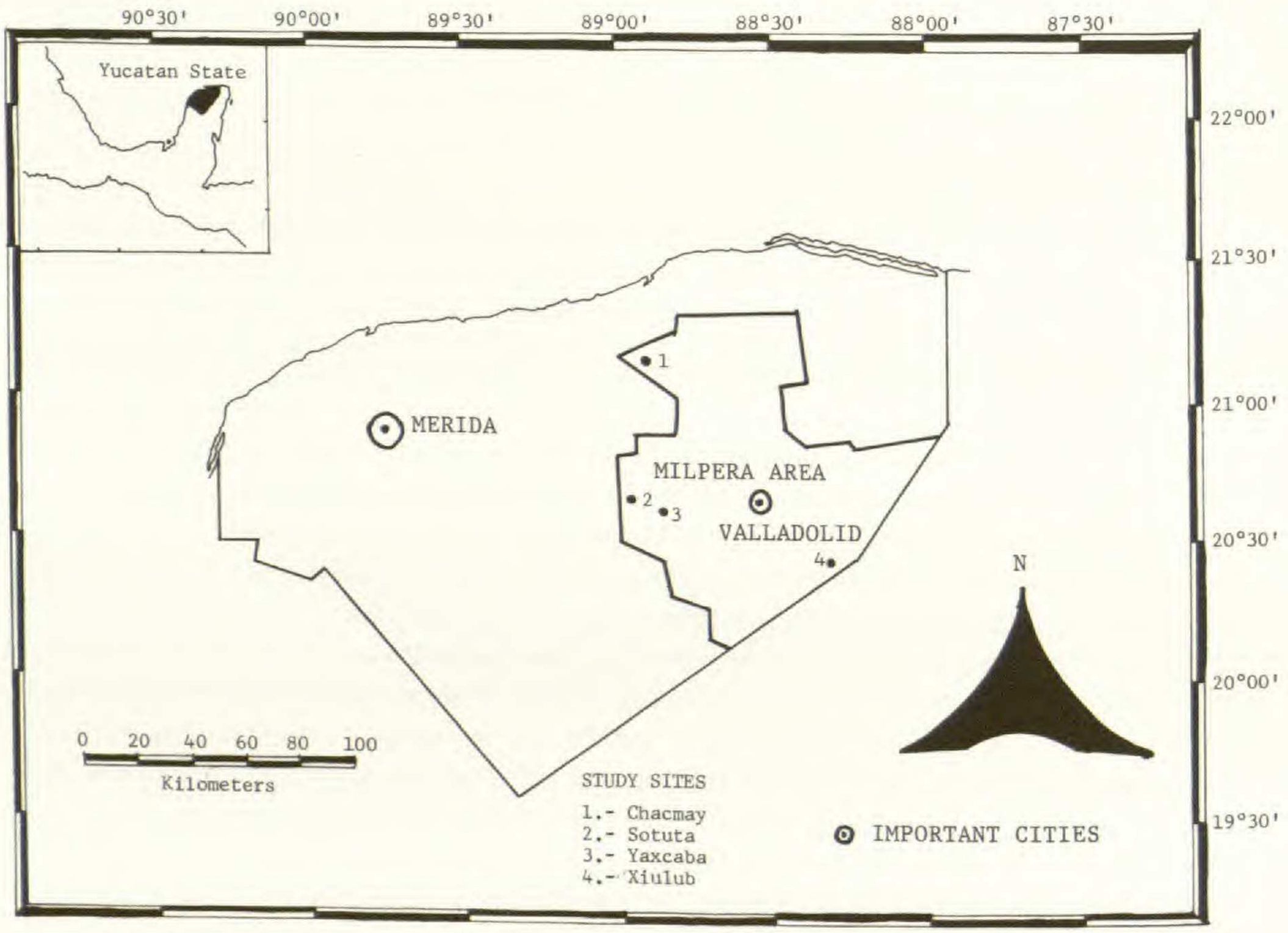
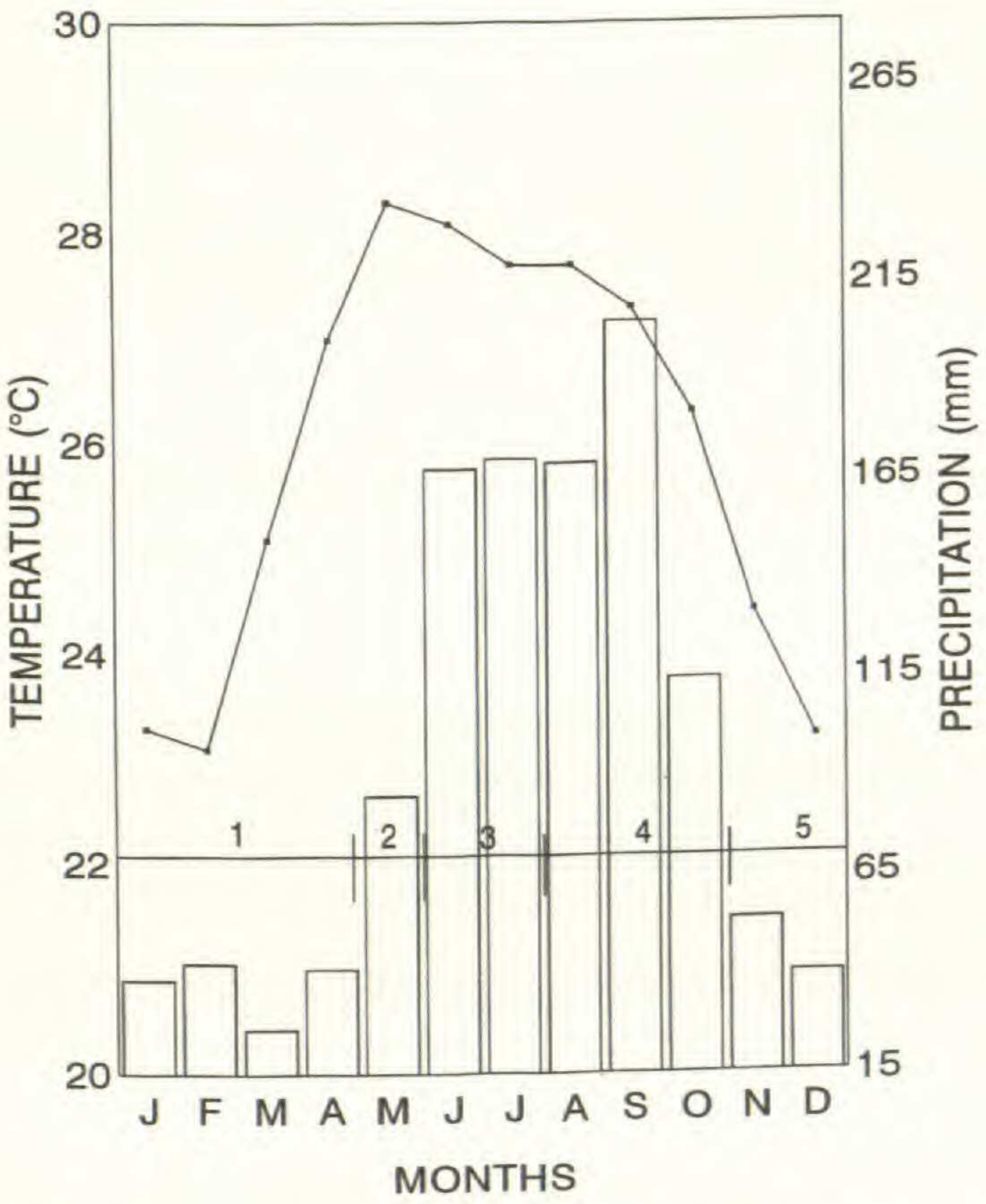


FIGURE 1.—Milpera area in Yucatan state where this study was carried out.

Mesoamerica people, including the Maya, cultivate more than corn. True *milpa* cultivation, as practiced by the Maya, involves mixed cropping of many types of squashes, watermelon and other types of melons, chilis, tomatoes, tubers such as sweet potatoes and other starchy roots (*macales*), jícamas, sugar cane, onions, and beans (De Landa 1978; Harrison and Turner 1978; Hernández X. 1981; Adams 1982; Coe 1986; Flannery 1982; Sanabria 1986; Gómez-Pompa, Grey, and Chan 1986; Pérez Toro 1981; Teran and Rasmussen 1994). The *milpa* has conserved germplasm while providing subsistence to the people of the Americas through time (Steggerda 1941; Vavilov 1951; Várguez 1981; Wolf 1983; Sosa, Flores, Gray, Lira, and Ortiz 1985).

The Yucatec Mayan maize area is located in the east-central region of the Yucatan Peninsula. It has a sub-humid tropical climate, with summer rains and an average annual precipitation of between 800 and 1200 mm (García 1973). The dry season lasts from January to April and the wet season from May to December (Figure 2). This yearly cycle of drought and rain characterizes the *milpero* cycle in the major part of Mesoamerica (Wolf 1983). The dominant vegetation type is medium-height subdeciduous forest. This type covers a large area of the state of Yucatan (Flores and Espejel 1992); it is where traditional agriculture is generally practiced.



1. Dry period (corn harvest) and preparation of the soil (slash and burn).
2. Period of planting the corn with the first rain.
3. Canícula period (during the absence of the rain 15 to 30 days) time in which the ***ch'a chaak*** is performed.
4. Rainy period.
5. End of rainy season.

FIGURE 2.—Climate graph of the milpera zone of Yaxcaba, Yucatan, Mexico.

Frequently, in June and July there is a dry period, called the *canícula* by local farmers, in which the maize seeds planted at the onset of the rains need additional water for their development. The duration of this period is a constant concern of the *milperos*, since it may cause the loss of the crops essential to their survival.

It is possible that this situation motivated the Maya to give the elements of nature a high status in their religion and a role as gods in their pantheon. They worship the sun, wind, rain, plants, and animals. Images of these natural elements are prominent in ancient Mayan sculptures, pyramids, and the temples in which they offered products of their daily activities, especially agricultural products, to their gods (Morley 1983; Thompson 1984; Sodi 1991; Coe 1986).

OBJECTIVES AND METHODS

The objectives of the current research were: 1) To list plants used in the ***ch'a chaak*** ritual practice, 2) to understand the reasons for the use of diverse plants in this ritual, and 3) to quantify the native plants used in this ritual and their purity of use through time.

To accomplish these objectives we obtained prior authorization from the ***h'men*** and the *milpero*s holding ***ch'a chaak*** ceremonies in various parts of the maize zone of the state of Yucatan. This study was accomplished between May and July in the period of the *canícula*. Plants observed and collected for the diverse activities of this ritual were identified using Latin names, and were prepared for, and deposited in, the Herbarium of the Universidad Autónoma de Yucatán and in the Xal Herbarium in Xalapa, Veracruz. Interviews focused especially on the ***h'menob*** (plural of ***h'men***), their helpers, the ***itzaeob*** and the ***chaaqueob***, "men who call the rain." These are usually the youngest participants and they produce sounds like toads during the ritual. We also interviewed the *milpero*s and elderly people of the region (Figure 3). Research results are incorporated in the Floral and Ethnobotanical Information Bank at the Universidad Autónoma de Yucatán (BADEPY and BAFLOPY). Maya names of plants are interpreted according to Sosa *et al.* (1985) and Barrera-Marín, Barrera-Vázquez, and Franco (1976).

The calculation of cultural purity is a simple relationship we call the Index of Purity, which is the percent of native plants to all plants used in the ritual. This index is expressed by the following formula:

I.P.R. = 100(TPU - TPI)/TPU,

in which: IPR = Index of Ritual Penetration, TPU = Total number of plants used in the ritual, and TPI = Total number of introduced plants used (i.e., those not native to the Americas).

TABLE 1.—Plant species used in the ***ch'a chaak*** ritual in the milpera zone in the state of Yucatan.

Plant Family[1]	Species	Maya Name	LF[2]	Part Used	Notes
AGAV	*Agave angustifolia* Haw.	***xix ij***	H	green leaves	To cover tamales in the ***pib***
ASTER	*Viguiera dentata* (Cav.) Sprengel	***taj***	H	leaves	To cover tamales in the ***pib***
BIGNONI	*Crescentia cujete*	***joma'luuch***	T	fruits *(jícaras)*	Sacred drink for recipients
BIX	*Bixa orellana* (L.)	***kiwi***	T		Tamale condiment
BORAGIN	*Cordia gerascanthus* (L.)	***bacalche'***	Sh	leaves	To cover tamales before burial and cooking
BORAGIN	*Ehretia tinifolia* A.DC.	***beek***	T	leaves	To cover tamales in the ***pib***

TABLE 1.—Continued.

Plant Family[1]	Species	Maya Name	LF[2]	Part Used	Notes
BURSER	*Bursera simaruba* (L.) Sarg	***chakaj***	T	stems	1) To construct altar cross, whips, and machetes 2) To call the rain and scare away "bad winds"
BURSER	*Protium copal* (Schlecht. & Cham.) Engl.	***poom te***	T	resin	1) Burned to purify environment and assistants 2) Resemble rain drops; serve as offering for good ***chaak***
FAB	*Acacia gaumeri* Blake	***box kaatsim***	T	wood	Most important wood for cooking tamales in the ***pib***
FAB	*Caesalpinia yucatanensis*	***taak'in che'***	T	wood	Used in cooking
FAB	*Lonchocarpus longistylus* Pittier	***ba'al che'***	T	bark	Fermented in water and honey of European bees for ritual drink ***balche'***
FAB	*Lysiloma latisiliquum* (L.) Benth.	***tsalam***	T	wood	To construct the altar and stir the branches in the fire
FAB	*Mimosa bahamensis* Benth.	***sak kaatsim***	T	wood	Heats ***pib*** tamales without smoke/ steam
FAB	*Phaseolus lunatus* (L.)	***iib***	H		Ritual food of ***ch'a chaak***
FAB	*Phaseolus vulgaris* (L.)	***bu'ul***	H		Ritual food of ***ch'a chaak***
FAB	*Piscidia piscipula* (L.) Sarg.	***ja'abin***	T	branches	To adorn arches and regulate the rain
FAB	*Pithecellobium albicans* (Kunth) Benth.	***chimay***	T	wood	To cook tamales
LILI	*Allium cepa* (L.)	***xku***	H		To flavor food
LILI	*Allium sativum* (L.)	***kukut***	Sh		To flavor food
MALPIGH	*Bunchosia glandulosa* (Cav.) DC.	***siip che'***	Sh	branches	To make a cluster used by ***h'men*** and by ***itza*** to purify assistants
MALV	*Abutilon umbellatum* (L.) Sweet	***sak le'***	Sh	leaves	To cover tamales in the ***pib***

TABLE 1.—Continued.

Plant Family[1]	Species	Maya Name	LF[2]	Part Used	Notes
MALV	*Hampea trilobata* Standley	***jool***	T	shoots	1) To construct the altar and to stir broth
				branches	2) To cover tamales in the ***pib***
MUS	*Musa paradisiaca*	***platano***	H	leaves	To envelop corn tamales
PIPER	*Piper auritum* H.B.K.	***xmakulan***	Sh		To give fragrance to tamales and cover them for cooking
PO	*Zea mays* (L.)	***nal***	H	fruits	1) To make the tamale masa and ***sak k'ool,*** or soup
				seedlings	2) Placed at the four corners of the altar
POLYGON	*Coccoloba cozumelensis* Hemsley	***boob***	T	leaves	To cover soil of ***pib*** hole and to cover and carry tamales to the altar
POLYGON	*Gymnopodium floribundum* Rolfe	***dzidzilche'***	T	wood	Important for cooking tamales
POLYGON	*Neomillspaughia emarginata* (Gros.) Blak.	***saj iitsa'***	Sh	leaves	To cover the biggest part of the ***pib***
RUBI	*Randia longiloba* Hemsley	***k'ax***	T	fruits	To make whistles with which the priests call the winds to bring rain
RUT	*Citrus aurantifolia* (Christh.) Swingle	***limón***	T	juice	Important accompaniment to the meal
RUT	*Citrus aurantium* (L.)	***pak'aal*** *(naranja agria)*	T	juice	Important accompaniment to the meal
SOLAN	*Capsicum annum* (L.)	***xmaax iik chile maax***	H		Condiment important to the dishes
SOLAN	*Capsicum frutescens* (L.)	***iik*** *(habanero)*	H		Condiment for ***atole***
SOLAN	*Lycopersicon esculentun* Miller	***p'ak***	H	fruits	To prepare tamales and sacred food and, because they contain much water, to call rain

TABLE 1.—Continued.

Plant Family[1]	Species	Maya Name	LF[2]	Part Used	Notes
SOLAN	*Nicotiana tabacum* (L.)	***k'uts***	Sh	leaves	Cigarettes which assistants smoke to scare away bad winds which divert the rain
STERCUL	*Guazuma ulmifolia* Lam.	***piixoy***	T	shoots	1) To construct the altar
				bark	2) To make lashings
VIT	*Cissus rhombifolia* Vahl	***xtakan xtaab ka'an***	V	vine	Holds up the corners of the altar; oriented toward the four cardinal points
VIT	*Vitis tiliifolia* Humb. & Bonpl.	***xta'ka'anil***	V	vine	Fastens trees to corners of the altar and used to call the rain-filled winds

[1] Botanical family names have been abbreviated by eliminating the invariant suffix -ACEAE.
[2] LF = Life form: H = herb, Sh = shrub, T = tree, V = vine.

TABLE 2.—Number of species and percentages by family of all plants used in the ***ch'a chaak*** ritual.

Plant Family	Number of Species	Percent of Total Species
AGAVACEAE	1	2.6%
ASTERACEAE	1	2.6%
BIGNONIACEAE	1	2.6%
BIXACEAE	1	2.6%
BORAGINACEAE	2	5.3%
BUSERACEAE	2	5.3%
FABACEAE	9	23.7%
LILIACEAE	2	5.3%
MALPIGHIACEAE	1	2.6%
MALVACEAE	2	5.3%
MUSACEAE	1	2.6%
PIPERACEAE	1	2.6%
POACEAE	1	2.6%
POLYGONACEAE	3	7.9%
RUBIACEAE	1	2.6%
RUTACEAE	2	5.3%
SOLANACEAE	4	10.5%
STERCULIACEAE	1	2.6%
VITACEAE	2	5.3%
TOTAL	38	100.0%

RESULTS

A great diversity of plants are used in the ***ch'a chaak*** ritual (see Tables 1-4). First, we determined the scientific names (family, genus, and species) of the plants used in the ritual; we also noted the Maya names of the plants, their life forms, and their use in the ritual. Table 2 shows the percentages of plants used by family; in Table 3 we classify the plants according to their primary use in the rite; and in Table 4 we list the plants by life form.

TABLE 3.—Primary uses of plants associated with the ***ch'a chaak*** ritual.

Life Form	Number of Species	Percent of Total Species
Species related to the wind	2	5.3%
Divert the dry winds	3	7.9%
Ritual essentials	4	10.5%
Protectors of water	5	13.2%
Associated with water	24	63.2%
Total	38	100.1%

TABLE 4.—Life forms of plants used in the ***ch'a chaak*** ritual.

Life Form	Number of Species	Percent of Total Species
Trees	19	50.0%
Shrubs	7	18.4%
Herbs	10	26.3%
Vines	2	5.3%
Total	38	100.0%

Morley (1983) and Thompson (1984) considered the ***ch'a chaak*** to be one of the most elaborate Maya rituals, attaining its greatest complexity in the Classic period of the Maya civilization. During the Classic period the Maya knew their environment well and had developed extraordinary levels of culture and social organization (Redfield 1968).

The present study permits us to understand how this ritual develops over a four to seven day period, as it is currently practiced in the forest near the *milpa*. The ***h'men*** (Maya priest), his helpers, and the *milpero*s of the area jointly organize the ritual.

No women or children are present. Sometimes women collaborate by preparing meals, but they stay away from the place where the ceremony is taking place. This was what we observed in Yaxcabá. In two other places, children were admitted to imitate frogs while the ***chaaque*** were calling the rain.

Ceremonial activities involve knowledge of plants, animals, climate, astronomy, chemistry (fermentation), soils, medicine, and combustion (firewood). These activities also require knowledge of prehispanic and posthispanic religion and culinary arts. In sum, the ***ch'a chaak*** is a practice that integrates much of the phi-

losophy and religion of the Maya. It has been described previously in great detail by authors cited in the bibliography. It is closely tied to the most important agroecosystem of the region, the *milpa* (cf. Alcorn 1984).

Plant species are used in the ritual for the preparation of the altar, of the sacred drink (***balche'***), and of ritual foods and condiments. In all activities directly related to the ritual they use a total of 38 plant species of 19 botanical families. In this list we exclude plants that only indirectly relate to the rite; for example, plants eaten by the animals they hunt in the forest as part of the ritual.

Of the 19 families utilized, the legume family (Fabaceae) is the most prominent (Table 2), contributing nine species (23.7 %), including those used to prepare the sacred ritual drink ***balche'***. Of the 38 species used, 33 are native while five were introduced by the Spanish. Our index of ritual putity (IPR) shows that the Maya ***ch'a chaak*** ritual, as currently practiced, is strongly conservative of local traditions, since 87% of the plants used are native. In this rite they use all of the primary life forms: trees, shrubs, herbs, and vines (see Table 4), with trees most prominent among the ritual plants.

Trees are used for the altar where they put the cross and lay down the other implements (Figure 3). Among these trees are *Bursera simaruba* (***Chakaj*** "water stick"), *Piscida piscipula* (***ja'abin*** "the one which brings the water"), a tree that by its blooming announces the coming of the rains. It is also an indicator of the dry season, when its leaves fall. The bark of the ***balche'*** tree (*Lonchocarpus longistylus*) is used to prepare the sacred drink for the rite. Other trees have some specific use, such as good firewood, e.g., ***box catzin*** (*Acacia gaumeri*). Such wood burns fast and produces little smoke, important conditions for the preparation of the ***pib*** (food cooked in an underground oven made with stones). The earth oven must receive just the right amount of heat so that the ***pib*** neither tastes smoky nor is blackened.

FIGURE 3.—Gratitude offering to god ***chaak***. Note the plants used to construct the altar for the ***ch'a chaak*** ritual.

In total, trees constitute 50% of the plant species used in the rite, followed by herbs, 26.3%, especially corn, the plant central to the rite. Ears of corn pointing to the four cardinal directions, are aligned precisely in each of the four corners of the altar, where the ***chaaqueob*** "men who call the rain" sit. Other herbs used produce odors on being heated, such as ***taj*** (*Viguiera dentata*), onion (*Allium cepa*), and garlic (*Allium sativum*). Others are seasonings that flavor the food, e.g., tomato (*Lycopersicon esculentum*). The vines used have succulent stems, a property that the Mayas say attracts rain (see Tables 1, 4).

The Mayas have selected ritual plants by criteria they relate to water. For example, tubers which store water are said to attract water. The same association exists for plants with thick fleshy stems and stalks or with juicy fruits and seeds. Everything is valued in relation to water, which is the precious liquid of life to the Maya.

Some trees indicate the presence of moist soils and are also ritually important. Among these are bananas (*Musa* spp.) which, though introduced, have great ritual value as indicators of humidity. This principle may also explain the ritual value of plants used to cover ritual foods, such as ***beeb*** or "roble" (*Ehretia tinifolia*), ***boob*** (*Coccoloba cozumelensis*), and ***saj iitsa*** (*Neomillspaugia emarginata*). As mentioned previously, ***ja'abin*** (*Piscidia piscipula*) is an indicator of wet or dry conditions according to the falling of its leaves. If the tree loses its leaves at the beginning of the dry season during the months of November and December, the forthcoming season will be dry, but if the leaves stay on the tree until the beginning of the rainy season, it indicates a very wet season.

The vines which support the altar are oriented to the cardinal points (see Figure 3). These vines should have fleshy shoots to attract the rain. This is especially true for those oriented to the east and west, directions of the rain-bringing winds. By contrast, those parts of the altar oriented to the north or south may include non-fleshy plants, such as the bark of *Piscidia piscipula*, *Hampea trilobata*, and *Abutilon umbellatum*, since these directions have no winds which bring rain.

CONCLUSION

The ***ch'a chaak*** ritual demonstrates the great knowledge the Maya people have of the elements of nature. It evolved in conjunction with the *milpa* system of agriculture and is clearly bound to the cultivation of the *milpa*. The ***ch'a chaak*** is one of the most purely traditional of Maya rituals. It is practiced today essentially as it has been since prehispanic times. We estimate that the ritual invocations and prayers to the deities are 80% Maya and only 20% Catholic. Almost all of the ritual is performed in the Maya language. Virtually all of the plants used in the ritual have Maya names and traditional uses. In the case of the ritual plants used, there is a Purity Index of 87%, with only five introduced species: banana, lemon, sour orange, onion, and garlic. These introduced plants are used for the preparation of the meals offered to the Rain God (***chaak***) and are eaten at the end of the ritual by the attendants. (Maya people believe that garlic keeps away the bad winds that take the rain away.) The sacred drinks, incense and honey, are common to all these rituals. Though today honey from the introduced European honey bee (*Apis mellifera*) is used; honey from native stingless bees (*Melipona* spp.) was used prior to the arrival of the Spanish.

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